

FOR DIVISION USE ONLY

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DOGM Lead: John Rogers  
Permit Fee \$ 500.00 Ck # 16340

TaskID# 3579

**STATE OF UTAH**  
**DEPARTMENT OF NATURAL RESOURCES**  
**DIVISION OF OIL, GAS AND MINING**  
1594 West North Temple Suite 1210  
Box 145801  
Salt Lake City, Utah 84114-5801  
Telephone: (801) 538-5291 Fax: (801) 359-3940

**NOTICE OF INTENTION TO COMMENCE LARGE MINING OPERATIONS**

The informational requirements in this form are based on provisions of the Mined Land Reclamation Act, Title 40-8, Utah Code Annotated 1953, General Rules and Rules of Practice and Procedures.

**This form applies only to mining operations which disturb or will disturb more than five acres at any given time.**

"MINING OPERATIONS" means those activities conducted on the surface of the land for the exploration for, development of, or extraction of a mineral deposit, including, but not limited to, surface mining and the surface effects of underground and in situ mining, on-site transportation, concentrating, milling, evaporation, and other primary processing.

"Mining operation" does not include: the extraction of sand, gravel, and rock aggregate; the extraction of oil and gas as defined in Chapter 6, Title 40; the extraction of geothermal steam; smelting or refining operations; off-site operations and transportation; or reconnaissance activities which will not cause significant surface resource disturbance or involve the use of mechanized earth-moving equipment such as bulldozers or backhoes.

**PLEASE NOTE:** *This form is to be used as a guideline in assembling the information necessary to satisfy the Large Mining Operations Notice of Intention requirements. **You will need extra space to provide a majority of the information requested.** Please provide the information on additional sheets and include cross-referenced page numbers as necessary. The Permittee / Operator may submit this information on an alternate form; however, the same or similar format must be used.*

**RECEIVED**  
**JUN 07 2010**  
**DIV. OF OIL, GAS & MINING**

**I. Rule R647-4-104 - Operator(s), Surface and Mineral Owners**

The Permittee / Operator must provide the name, address and telephone number of the individual or company who will be responsible for the proposed operation. **Business entities listed as the Permittee / Operator, must include names and titles of the corporate officers on a separate attachment.**

**1. Mine Name: Trace Mine 1 – Aumco Claim S/039/0001**

2. Legal name of entity (or individual) for whom the permit is being requested: AZOMITE Mineral Products  
Mailing Address: 7406 NE 84<sup>th</sup> Terrace  
City, State, Zip: Kansas City, MO 64157  
Phone: 816-415-1919 Fax: 816-415-1925  
E-mail Address: wes.e@azomite.com information@azomite.com

Type of Business: Corporation ( ☒ ) LLC ( ☐ ) Sole Proprietorship (dba) ( ☐ )

Partnership ( ☐ ) General ☐ or ☐ limited

Or:

Individual ( ☐ )

**Entity must be registered (and maintain registration) with the State of Utah, Division of Corporations (DOC) [www.commerce.utah.gov](http://www.commerce.utah.gov).**

Are you currently registered to do business in the State of Utah? G **Yes** G No

Entity # 7183569-0143

If no, contact [www.commerce.utah.gov](http://www.commerce.utah.gov) to renew or apply.

Local Business License # \_\_\_\_\_ (if required)

Issued by: County \_\_\_\_\_ or City \_\_\_\_\_

Registered Utah Agent (as identified with the Utah Department of Commerce) (if individual leave blank):

Name: Clyde Larsen

Address: 50 West Louise Ave.

City, State, Zip: Salt Lake City, UT 84115

Phone: 801-484-1777 Fax: 801-484-1782

E-mail Address: clydelarsen@qwestoffice.net

**3. Permanent Address:**

Address: 7406 NE 84<sup>th</sup> Terrace

City, State, Zip: Kansas City, MO 64157

Phone: 816-415-1919 Fax: 816-415-1925

**4. Contact Person(s) Please provide as many contacts as necessary.**

Name: Wes Emerson Title: President

Address: 7406 NE 84<sup>th</sup> Terrace

City, State, Zip: Kansas City, MO 64157

Phone: 816-415-1919 Fax: 816-415-1925

Emergency, Weekend, or Holiday Phone: 816-510-7717

E-mail Address: wes.e@azomite.com

Contact person to be notified for: permitting (x) surety (x) Notices (x) (please check all that apply)

Name: Jim Phillips Title: Director of Operations  
Address: 1123 South 250 East  
City, State, Zip: Nephi, UT 84648  
Phone: 801-318-0939 Fax:   
Emergency, Weekend, or Holiday Phone: 801-318-0939  
E-mail Address: jim@azomite.com

Contact person to be notified for: permitting (x) surety ( ) Notices (x) (please check all that apply)

5. Location of Operation:

County(ies) Sanpete County, Utah  
SW 1/4 of NW 1/4, Section: 4 Township: 175 Range: 1W  
1/4 of 1/4, Section:  Township:  Range:   
1/4 of 1/4, Section:  Township:  Range:

The names of the surface and mineral owners for any areas which are to be impacted by mining must be provided to the Division. This list should include all private, state and federal ownership and the owners of lands immediately adjacent to the project areas.

6. Ownership of the land surface (circle all that apply):

Private (Fee), Public Domain (BLM), National Forest (USFS), State of Utah (SITLA) or other:

Name: Azome Utah Mining Company Address:

7. Owner(s) of record of the minerals to be mined (circle all that apply):

Private (Fee), Public Domain (BLM), National Forest (USFS), State of Utah (SITLA) or other:

Name: Azome Utah Mining Company Address:

8. BLM Lease or Project File Number(s) and/or USFS Assigned Project Number(s): N/A

BLM Claim Numbers: N/A

Utah State Lease Number(s): N/A

Name of Lessee(s):

9. Adjacent land owners:

Name: Naniloa Investment Company Address: 5027 South Memory Lane  
Salt Lake City, Utah 84117 (per Sanpete Recorders Office – North/East/West sides)  
Name: State of Utah or BLM Address: (South Side)

**10. Have the land, mineral and adjacent land owners been notified in writing?**Yes \_\_\_\_\_ No XXIf no, why not? Expansion of Existing Mining Operation**11. Does the Permittee / Operator have legal right to enter and conduct mining operations on the land covered by this notice? Yes XX No \_\_\_\_\_.****II. Rule R647-4-105 - Maps, Drawings & Photographs****105.1 - Base Map**

A complete and correct topographic base map (or maps) with appropriate contour intervals must be submitted with this notice showing all of the items on the following checklist. The scale should be approximately 1 inch = 2,000 feet (preferably a USGS 7.5 minute series or equivalent topographic map where available). The map(s) must show the location of lands to be affected in sufficient detail to allow measurement of the proposed area of surface disturbance.

**Base Map Checklist**

Please check off each section to verify these features are included on the map(s) or explain why it is not applicable. Please add the map identification name or number which shows these features.

Check		Map ID
<u>x</u>	(a) Property boundaries of surface ownership of all lands which are to be affected by the mining operations;	<u>1</u>
<u>x</u>	(b) Perennial, intermittent, or ephemeral streams, springs and other bodies of water; roads, buildings, landing strips, electrical transmission lines, water wells, oil and gas pipelines, existing wells or boreholes, or other existing surface or subsurface facilities within 500 feet of the proposed mining operations;	<u>1</u>
<u>x</u>	(c) Proposed route of access to the mining operations from nearest publicly maintained highway (Map scale appropriate to show access);	<u>1</u>
<u>x</u>	(d) Known areas which have been previously impacted by mining or exploration activities within the proposed land affected;	<u>1</u>
<u>x</u>	(e) Areas proposed to be disturbed or reclaimed over the life of the project or other suitable time period.	<u>1</u>

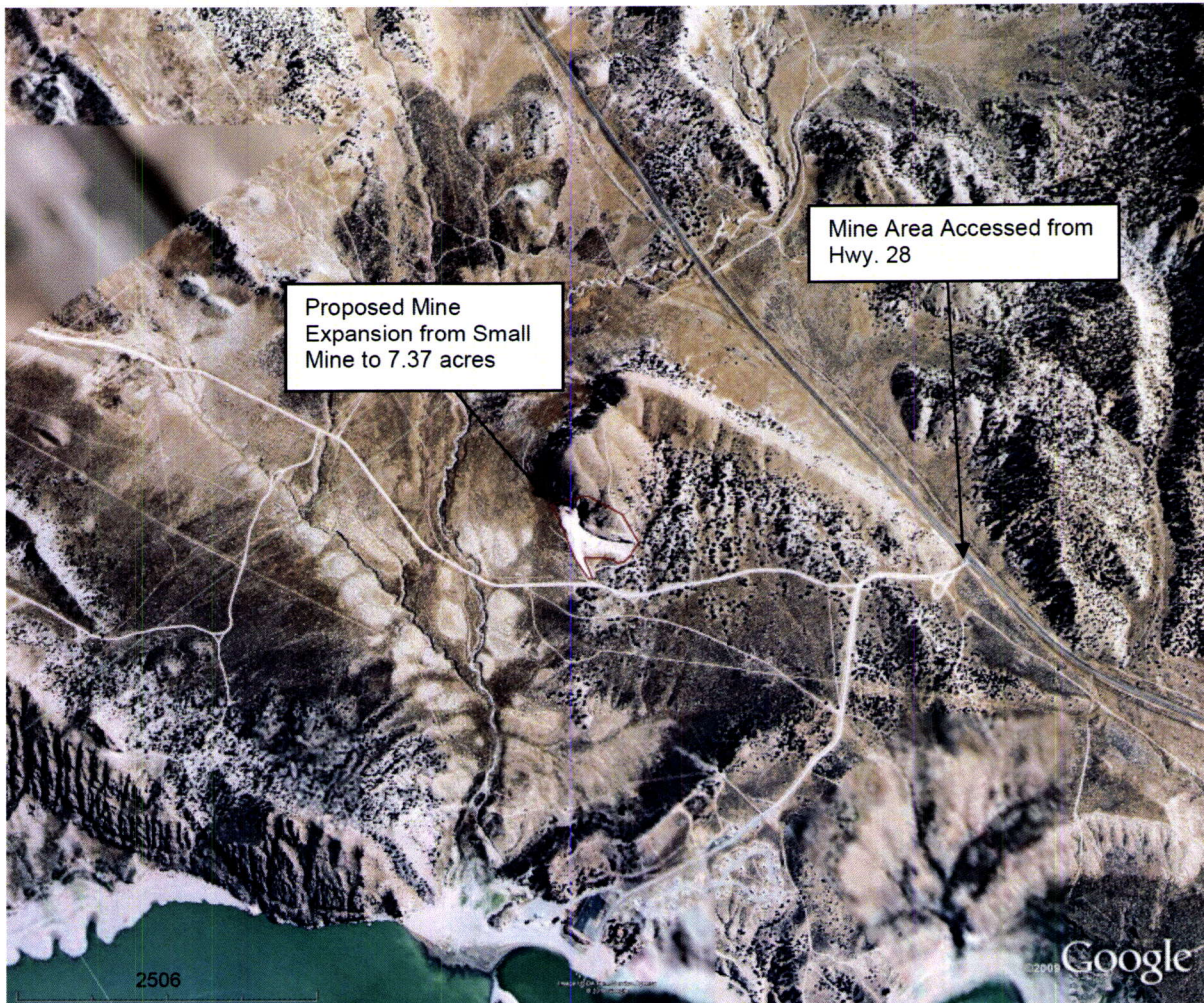


Figure 1

## 105.2 - Surface Facilities Map

### Surface Facilities Map Checklist

Surface facilities maps should be provided at a scale of not less than 1" = 500'.

Please check off each section to verify these features are included on the map(s) or explain why it is not applicable. Please add the map identification name or number which shows these features.

Check  
  x  

- (a) Proposed surface facilities, including but not limited to: buildings, stationary mining/processing equipment, roads, utilities, power lines, proposed drainage control structures, and the location of topsoil storage areas, overburden/waste dumps, tailings or processed waste facilities, disposal areas

Map ID

- for overburden, solid and liquid wastes, and wastewater discharge treatment and containment facilities; 2
- x (b) A border clearly outlining the extent of the surface area proposed to be affected by mining operations, and the number of acres proposed to be affected; 2
- N/A (c) The location of known test borings, pits, or core holes. 2



Figure 2

**105.3 - Additional Maps**Reclamation Treatments Map Checklist

Please check off each section to verify these features are included on the map(s) or explain why it is not applicable. Please add the map identification name or number which shows these features.

Check

Map ID

- |                |     |  |         |
|----------------|-----|--|---------|
| <u>  x  </u>   | (a) | Areas of the site to receive various reclamation treatments shaded, cross hatched or color coded to identify which reclamation treatments will be applied. Areas would include: buildings, stationary mining/processing equipment, roads, utilities, proposed drainage improvements or reconstruction, and sediment control structures, topsoil storage areas, waste dumps, tailings or processed waste facilities, disposal areas for overburden, solid and liquid wastes, ponds, and wastewater discharge, treatment and containment facilities. Reclamation treatments may include ripping, regrading, replacing soil, fertilizing, mulching, broadcast seeding, drill seeding, and hydroseeding: | 3 _____ |
| <u>  x  </u>   | (b) | A border clearly outlining the extent of the area to be reclaimed after mining, the number of acres disturbed, and the number of acres proposed for reclamation:   | 3 _____ |
| <u>  N/A  </u> | (c) | Areas disturbed by this operation which are included in a request for a variance from the reclamation standards:   | 3 _____ |
| <u>  N/A  </u> | (d) | Highwalls which are proposed to remain steeper than 45 degrees and slopes which are proposed to remain steeper than 3 horizontal : 1 vertical.   | 3 _____ |

**Note: Areas included in sections c & d will need to be referenced in the variance request section. Please shade or color code these areas on this map.**

Additional maps and cross sections may be required in accordance with Rule R647-4-105.3. Design drawings and typical cross-sections for each tailings pond, sediment pond, or other major drainage control structures must also be included.



Figure 3

### III. Rule R647-4-106 - Operation Plan

**106.1 - Mineral(s) to be mined:** Volcanic Ash – Trade Name AZOMITE®

**106.2 - Type of Operation Conducted:**

Mining of the Ore will be done on a periodic basis driven by end consumer demand. It is anticipated some stockpiling of material will occur on site to make the mining economically desirable. The basic mining plane consists of four phases: (1) Loosen the mineral deposit by one of two common methods – a) “rip” the ore with a large crawler or b) “drill and shoot” the deposit. (2) Reduce the loosened ore to an appropriate size (maximum of 18”) rock but typical processing may be <6” rock. (3) Stockpile material at mine – this minimizes contamination of the ore from outside sources. (4) Transport ore to our Nephi processing facility. There are no plans to build any permanent structures or house equipment at the site. No chemical storage will occur at the site.

**106.3 - Estimated Acreage**

Acreage listed here should match areas measured off the maps provided.

Areas of actual mining:	<u>Approx. 3.25</u>
Overburden/waste dumps:	<u>Approx. 0.75</u>
Ore and product stockpiles:	<u>Approx. 0.25</u>
Access/haul roads:	<u>Approx. 1.0</u>
Associated on-site processing facilities:	<u>0.0</u>
Tailings disposal:	<u>0.0</u>
Other – Previous Mine/Reclamation Area	<u>Approx. 2.12</u>
Total Acreage	<u>7.37</u>

#### 106.4 - Nature of material including waste rock/overburden and estimated tonnage

Describe the typical annual amount of the ore and waste rock/overburden to be generated, in cubic yards. Where does the waste material originate? What is the nature of the overburden/wastes (general chemistry/mineralogy and description of geologic origin)? Will it be in the form of fines or coarse material? What are the typical particle size and size fractions of the waste rock?

Thickness of overburden:	<u>1</u>	ft.
Thickness of mineral deposit:	<u>Average 45</u>	ft.
Estimated annual volume of overburden:	<u>750</u>	cu. yds.
Estimated annual volume of tailings/reject materials:	<u>0</u>	cu. yds.
Estimated annual volume of ore mined:	<u>428,570</u>	cu. yds.
Overburden/waste description:	<u>All Topsoil and dirt(including vegetation) currently covering the volcanic ash deposit</u>	

#### 106.5 - Existing soil types, location of plant growth material

Specific information on existing soils to be disturbed by mining will be required. General soils information may not be sufficient.

Provide specific descriptions of the existing soil resources found in the area. Soil types should be identified along with depth and extent, especially those to be directly impacted by mining.

**Soils** - The plan shall include an Order 3 Soil Survey (or similar) and map. This information is needed to determine which soils are suitable for stockpiling for revegetation. This soil data may be available from the local Natural Resources Conservation Service office, or if on public lands, from the land management agency. The map needs to be of such scale that soil types can be accurately determined on the ground (see Attachment I).

- (a) Each soil type to be disturbed needs to be field analyzed for the following:

Depth of soil material	<u>12</u>	inches
Volume (for stockpiling)	<u>10,487</u>	cu. yds.
Texture (field determination)		

pH (field determination)  
(cross reference with item 106.6) \_\_\_\_\_

- (b) Where there are problem soil areas (as determined from the field examination) laboratory analysis may be necessary. Soil samples to be sent to the laboratory for analysis need to be about one quart in size, properly labeled, and in plastic bags. Each of the soil horizons on some sites may need to be sampled. Soil sample locations need to be shown on the soils map. Soil analysis for these samples should include: texture, pH, Ec (conductivity), CEC (Cation Exchange Capacity), SAR, % Organic Matter, Total N, Available Phosphorus (as  $P_2O_5$ ), Potassium (as  $K_2O$ ), and acid/base potential.

#### 106.6 - Plan for protecting and redepositing existing soils

Thickness of soil material to be salvaged and stockpiled: 12 inches  
 Area from which soil material can be salvaged: (show on map) 3.25 acres  
 Volume of soil to be stockpiled: 5245 cu. yds.  
 (cross reference with item 106.5 (a))

All soil material will be stockpiled around the perimeter of the ore removal area. Typical stockpiling method will be the use of an excavator to "pull" material up away from any existing highwalls and place it in a continuous pile along the perimeter. Material will be stacked to minimize erosion and contamination of the ore below. As mining occurs and the suitable "bench" has been produced, the stockpile will be redeposited and seeded. The same process of "pulling" the material up into the a continuous stockpile will be completed for the next "bench".

#### 106.7 - Existing vegetative communities to establish revegetation success

**Vegetation** - The Permittee / Operator is required to return the land to a useful condition and reestablish at least 70 percent of the premining vegetation ground cover.

Provide the Division with a description of the plant communities growing onsite and the percent vegetation cover for each plant community located on the site. Describe the methodology used to obtain these values.

The percent ground cover is determined by sampling the vegetation type(s) on the areas to be mined (see Attachment I for suggested sampling methods).

- (a) Vegetation Survey - The following information needs to be completed based upon the vegetation survey:

Sampling method used \_\_\_\_\_  
 Number of plots or transects (10 minimum) \_\_\_\_\_

<u>Ground Cover</u>	<u>Percent</u>
---------------------	----------------

Vegetation (perennial grass, forb and shrub cover)	_____
Litter	_____
Rock/rock fragments	_____

Bare ground

100%

Revegetation Requirement  
(70 percent of above vegetation figure)

%

Indicate the vegetation community(ies) found at the site.

List the predominant perennial species of vegetation growing in each vegetation community type.

- (b) Photographs - The Permittee / Operator may submit photographs (prints) of the site to show existing vegetation conditions. These photographs should show the general appearance and condition of the area to be affected and may be utilized for comparison upon reclamation of the site. Photographs should be clearly marked as to the location, orientation and the date they were taken.

#### **106.8 - Depth to groundwater, overburden material & geologic setting**

No current data on groundwater.

The hill we are mining is a unique deposit. To date, we have found no competitive product which offers the wide array of trace elements and minerals.

#### **106.9 - Location and size of ore and waste stockpiles, tailings and treatment ponds, and discharges**

The only planned stockpiles are (1) Topsoil/Overburden for redeposition and (2) Mined Ore waiting to be transported for further processing. The unique deposit and market does not generate tailings, waste, or require treatment ponds.

#### **V. Rule R647-108 - Hole Plugging Requirements**

No drill holes open at this time.

#### **VI. Rule R647-109 - Impact Statement**

##### **109.1 - Surface and groundwater systems**

No impact to surface or groundwater is anticipated by the planned mining. Care will be taken during the stockpiling of overburden/topsoil to prevent excessive erosion. No water is used in the mining process and no surface water storage is planned or required.

##### **109.2 - Wildlife habitat and endangered species**

???

**109.3 - Existing soil and plant resources**

???

**109.4 - Slope stability, erosion control, air quality, public health & safety**

The mine remains a relatively small and periodic operation. All slopes will meet the criteria set forth by federal MSHA requirements. The slopes in the non-contiguous material will meet a 3:1 maximum and slopes in the contiguous material will comply with a 1:1 maximum. All areas will be reclaimed as soon as is feasible and not result in damage to the reclaimed area by the on-going mining operation. It is anticipated that our initial efforts will be the mine on the south and restore that as quickly as possible to the desired 3:1 slope. Our present forecasted quantities do not generate additional concern for air quality. The entire property is fenced and posted "No Trespassing" to discourage unauthorized individuals from entering the mine area.

**VII. Rule R647-4-110 - RECLAMATION PLAN****110.1 - Current land use and postmining land use**

The Azome Mining Company has been committed to mining this property since the early 1960's. It is anticipated that mining will continue until the reserve runs out. The total reserve has been estimated at over 10M tons.

Some grazing occurs in the area and the reclamation/reseeding should restore this land to its natural state.

**110.2 - Reclamation of roads, highwalls, slopes, leach pads, dumps, etc.**

Describe how roads will be reclaimed. Road reclamation may include: regrading cut and fill sections, ripping the road surface with a dozer, topsoil replacement, construction of water bars, construction of traffic control berms or ditches, and reseeding.

Highwall corners will be "softened" to present a more natural appearance. All benches will be graded, topsoil redeposited, and reseeded.

Non-highwall slopes will be reclaimed by regrading to a 3 horizontal : 1 vertical (3h:1v) configuration, topsoil replacement, contour ripping, pitting, and reseeding.

**110.3 - Surface facilities to be left**

N/A.

**110.4 - Treatment, location and disposition of deleterious materials**

N/A

**110.5 - Revegetation planting program and topsoil redistribution**

Revegetation program will consist of two primary steps: (1) redepositing soil material stockpiled during mining and (2) reseeding the disturbed areas with the appropriate seed combination..

a) Soil Material Replacement

Soil replacement material will be the native material removed and stockpiled. Depth of the current soil material varies. In some areas "rock outcroppings" exist and in others suitable material can be found. This material will be stockpiled around the perimeter of the disturbed area to allow for easy access and quick placement when redeposition occurs.

b) Seed Bed Preparation

All areas requiring reseeding will have the seed bed prepared by ripping or discing to a minimum of 12 inches and leaving the seed bed surface in as roughened condition as possible to enhance water harvesting, erosion control and revegetation success. Compacted surfaces such as roads and pads will be deep ripped a minimum of 18 inches.

c) Seed Mixture – Please See Attached Page

d) Seeding Method

All reseeding will be done using a typical broadcasting procedure.

e) Fertilization and Soil Amendments

N/A

f) Other Revegetation Procedures

It is anticipated that seeding will occur at the appropriate time of year to promote germination and water to the plants.

VIII. **Rule R647-4-112 VARIANCE**

N/A

IX. **Rule R647-4-113 - SURETY**

A Reclamation surety must be provided to the Division prior to final approval of this application. In calculating this amount, include the following major tasks:

- 1) Clean-up and removal of structures. - **N/A**
- 2) Backfilling, grading and contouring.

- 3) Soil material redistribution and stabilization.
- 4) Revegetation (preparation, seeding, mulching).
- 5) Safety gates, berms, barriers, signs, etc.
- 6) Demolition, removal or burial of facilities/structures, regrading/ripping of facilities areas. - **N/A**
- 7) Regrading, ripping of waste dump tops and slopes. - **N/A**
- 8) Regrading/ripping stockpiles, pads and other compacted areas.
- 9) Ripping pit floors and access roads.
- 10) Drainage reconstruction.
- 11) Mulching, fertilizing and seeding the affected areas.
- 12) General site clean up and removal of trash and debris.
- 13) Removal/disposal of hazardous materials. - **N/A**
- 14) Equipment mobilization.
- 15) Supervision during reclamation.

To assist the Division in determining a reasonable surety amount, please attach a reclamation cost estimate which addresses each of the above steps. The areas and treatments included in the reclamation treatments map should correspond with items included in the reclamation cost estimate. The reclamation costs used by the Division must be third party costs.

**X. PERMIT FEE [Mined Land Reclamation Act 40-8-7(i)]**

The Utah Mined Land Reclamation Act of 1975 [40-8-7 (I)] provides the authority for the assessment of permitting fees. Commencing with the 1998 fiscal year (July 1 - June 30), **and revised July 1, 2002**, annual permit fees are assessed to new and existing notices of intention and annually thereafter until the project disturbances are successfully reclaimed by the Permittee / Operator and released by the Division.

***Large mining permits require an initial submission fee and annual fee of \$500.00 for surface disturbance of 50 or less acres, or a \$1,000.00 fee for surface disturbance greater than 50 acres (see page six Section III, Rule R647-4-106.3 for estimated disturbance calculation). The appropriate fee MUST accompany this application or it cannot be processed by the Division.***

***PLEASE NOTE:*** If you are expanding from a small mining operation to a large mining operation, the appropriate large mine permit fee, less the annual \$150.00 small mine fee (if already paid) ***MUST*** accompany this application.

**XI. SIGNATURE REQUIREMENT**

I hereby certify that the foregoing is true and correct. (Note: This form **must** be signed by the owner or officer of the company/corporation who is authorized to bind the company/corporation).

Signature of Permittee / Operator/Applicant: \_\_\_\_\_

Name (typed or print): \_\_\_\_\_

Title/Position (if applicable): \_\_\_\_\_

Date: \_\_\_\_\_

**PLEASE NOTE:**

Section 40-8-13(2) of the Mined Land Reclamation Act provides for maintenance of confidentiality concerning certain portions of this report. Please check to see that any information desired to be held confidential is so labeled and included on separate sheets or maps.

Only information relating to the location, size or nature of the deposit may be protected as confidential.

Confidential Information Enclosed: ( ) Yes ( ) No

# Recommended Revegetation Species List

or

**Peak Minerals – Zurite, Inc.**  
**Trace Mine #1/Umco Claim**  
 S/03901

<u>Common Name</u>	<u>Species Name</u>	<u>*Rate lbs/ac (PLS)</u>
Hires crested wheatgrass	<u><i>Agropyron cristatum</i></u>	1.0
Luna pubescent wheatgrass	<u><i>Agropyron icopnorum</i></u>	2.0
Western wheatgrass	<u><i>Agropyron smithii</i></u>	2.0
Indian ricegrass	<u><i>Oryzopsis hymenoides</i></u>	2.5
Bluebunch wheatgrass	<u><i>Agropyron spicatum</i></u>	2.0
Ladak alfalfa	<u><i>Medicago sativa</i></u>	1.0
Yellow Sweetclover	<u><i>Melilotus officinalis</i></u>	0.5
Palmer penstemon	<u><i>Penstemon palmerii</i></u>	0.5
Wyoming big sagebrush	<u><i>Artemisia tridentata</i></u> <u><i>wyomingensis</i></u>	0.1
4-wing saltbush	<u><i>Atriplex canescens</i></u>	2.0
Forage Kochia	<u><i>Kochia prostrata</i></u>	0.5
Total seed		14.1 lbs/ac

\* Rate is recommended for broadcast seeding.

Prepared by DOGM Aug. 2000

## **Attachment I**

### **Vegetation Cover Sampling**

Vegetation cover sampling determines the amount of ground that is covered by live vegetation. It is divided into four categories which equal 100 percent. They are:

Vegetation - This is the live perennial vegetation. Care should be taken to avoid sampling in disturbed areas that have a large percentage of annual or weedy vegetation, such as cheatgrass and russian thistle.

Litter - This is the dead vegetation on the ground, such as leaf and stem litter.

Rock/rock fragments - This is the rock and rock fragments on the soil surface.

Bare ground - This is the bare soil which is exposed to wind and water erosion.

**Cover Sampling** - The following methods are acceptable:

#### **Ocular Estimation**

This method visually estimates the percentage of ground covered in a plot by the four components. Plot size is usually a meter or yard square or a circular plot 36 inches in diameter. Ten to twenty plots should be randomly sampled in each major vegetation type.

#### **Line Intercept**

Percent ground cover is obtained by stretching a tape measure (usually 100') over the ground and then recording which of the four components is under each foot mark. At least ten of these transects should be randomly laid out and measured in each major vegetation type.

### **Soil Survey and Sampling Methods**

If a Natural Resource Conservation Service or land management agency soil survey is not available, the Permittee / Operator shall delineate all soil types that will be disturbed by mining on a map. Each soil type shall be sampled for its characteristics and inherent properties. Representative sampling locations should have similar geologic parent material, slopes, vegetative communities and aspects. The sampling locations should be representative of the soil type and be identified on the map. Sampling shall be at a minimum of one for each soil type disturbed.

The soil map needs to be of sufficient scale so that each soil type can be accurately located on the ground.

Generally, a soil sample for each soil type or substitute topsoil material that is planned use in revegetation will require a lab analysis for chemical/fertility properties. These parameters may include, but are not limited to: soil texture, pH, SAR (sodium absorption ratio), EC (electrical conductivity), % organic matter, CEC (cation exchange capacity), N, P (phosphorus as  $P_2O_4$ ), and K (potassium as  $K_2O_5$ ). Please contact the Division's soils specialist to determine which parameters will need analysis for your site.